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**Lin**

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(54) **CULTIVATOR**

(76) Inventor: **Huang-Lung Lin**, Puyan Township,  
Changhua County (TW)

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**A01B 1/00** (2006.01)

(52) **U.S. Cl.** ..... **172/378; 172/25**

(58) **Field of Classification Search** ..... 172/21,  
172/371, 374, 378, 25; 403/66, 93, 341  
See application file for complete search history.

(56) **References Cited**

**U.S. PATENT DOCUMENTS**

252,738	A *	1/1882	Chesbro	15/104.05
256,039	A *	4/1882	Peters	175/320
D31,896	S *	11/1899	Swartz	D8/13
1,202,772	A *	10/1916	Baird	172/371
1,945,430	A *	1/1934	Garrett	403/66
2,082,476	A *	6/1937	Allen	172/25
2,487,696	A *	11/1949	Coffing	403/4
2,787,491	A *	4/1957	Roberts	294/51
3,960,218	A *	6/1976	Atchley et al.	172/13

4,905,768	A *	3/1990	Lorenz	172/25
5,207,466	A *	5/1993	Ohlson	294/61
5,706,900	A *	1/1998	Liao	172/378
5,709,273	A *	1/1998	Roth	172/22
D406,219	S *	3/1999	Basek	D8/13
6,843,324	B2 *	1/2005	Basek	172/378
7,347,276	B2 *	3/2008	Basek	172/25
D579,738	S *	11/2008	Karczewski	D8/7
D586,632	S *	2/2009	Lai	D8/6
8,047,300	B1 *	11/2011	Lin	172/349
D657,212	S *	4/2012	Pare et al.	D8/8

\* cited by examiner

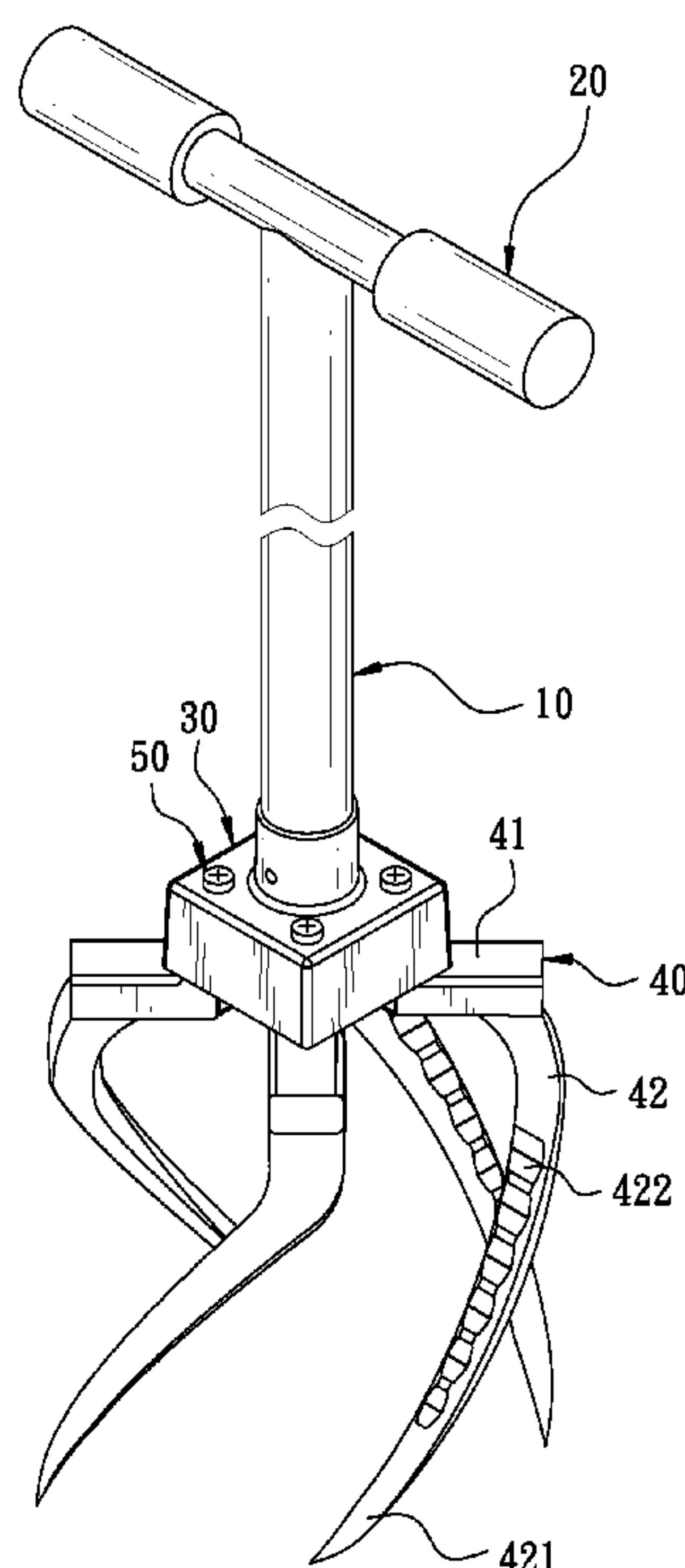
*Primary Examiner* — Jamie L McGowan

(74) *Attorney, Agent, or Firm* — Ming Chow; Sinorica, LLC

(57) **ABSTRACT**

A cultivator includes an operation rod, a handle, a base, and a plurality of claw members. The operation rod has a rotating central axle. The handle is disposed on one end of the operation rod. The base is fixed to another end of the operation rod. The base has non-circle connecting troughs at a circumferential portion thereof. Each of the connecting troughs has vertical connecting surfaces therein. Each claw member has a vertical connecting block and a claw portion. The connecting block has a non-circle cross-section. The connecting block has vertical mating surfaces on outer sides thereof. The connecting block is inserted in the connecting trough. The matching surfaces are vertically engaged with the connecting surfaces and confined by the connecting surfaces. The connecting block is coupled at a predetermined angle. The claw members are disposed in an oblique and curve form.

**10 Claims, 6 Drawing Sheets**



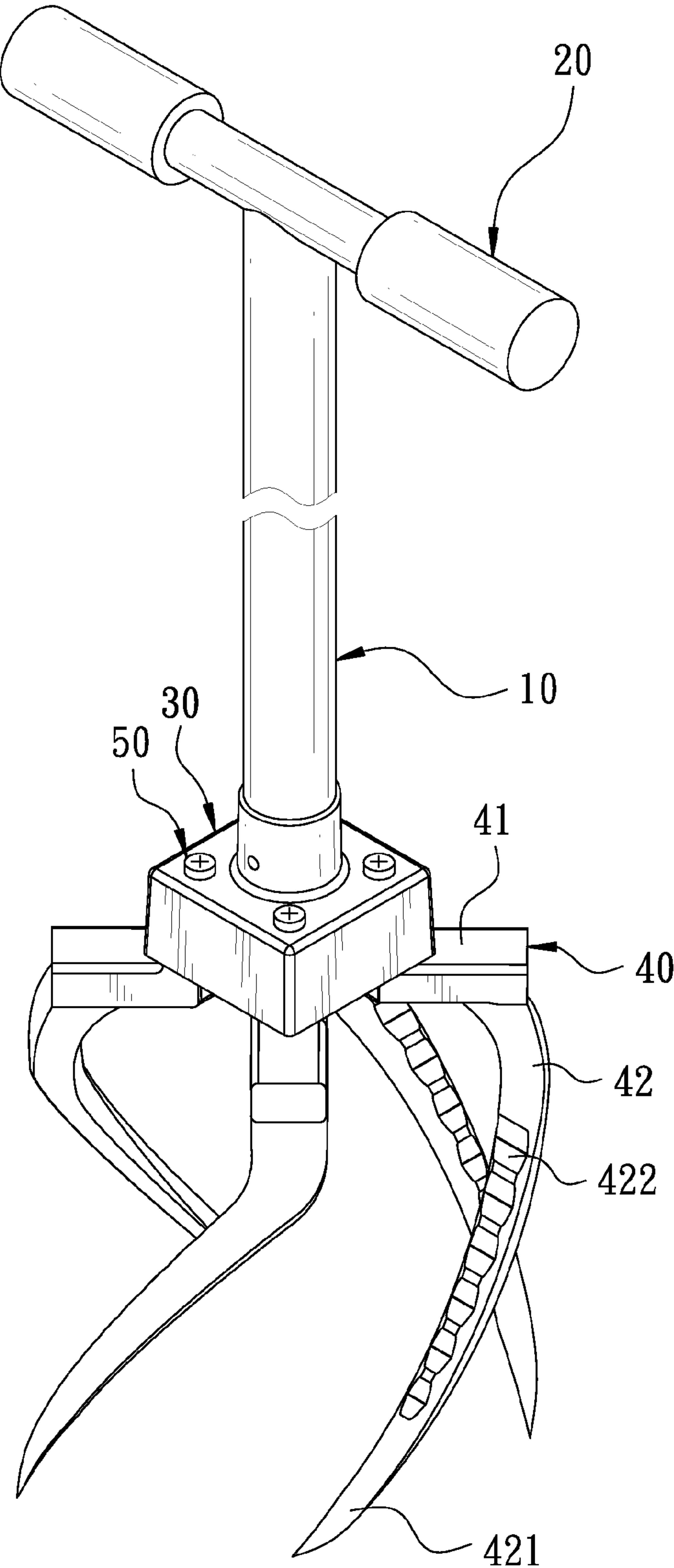


FIG. 1

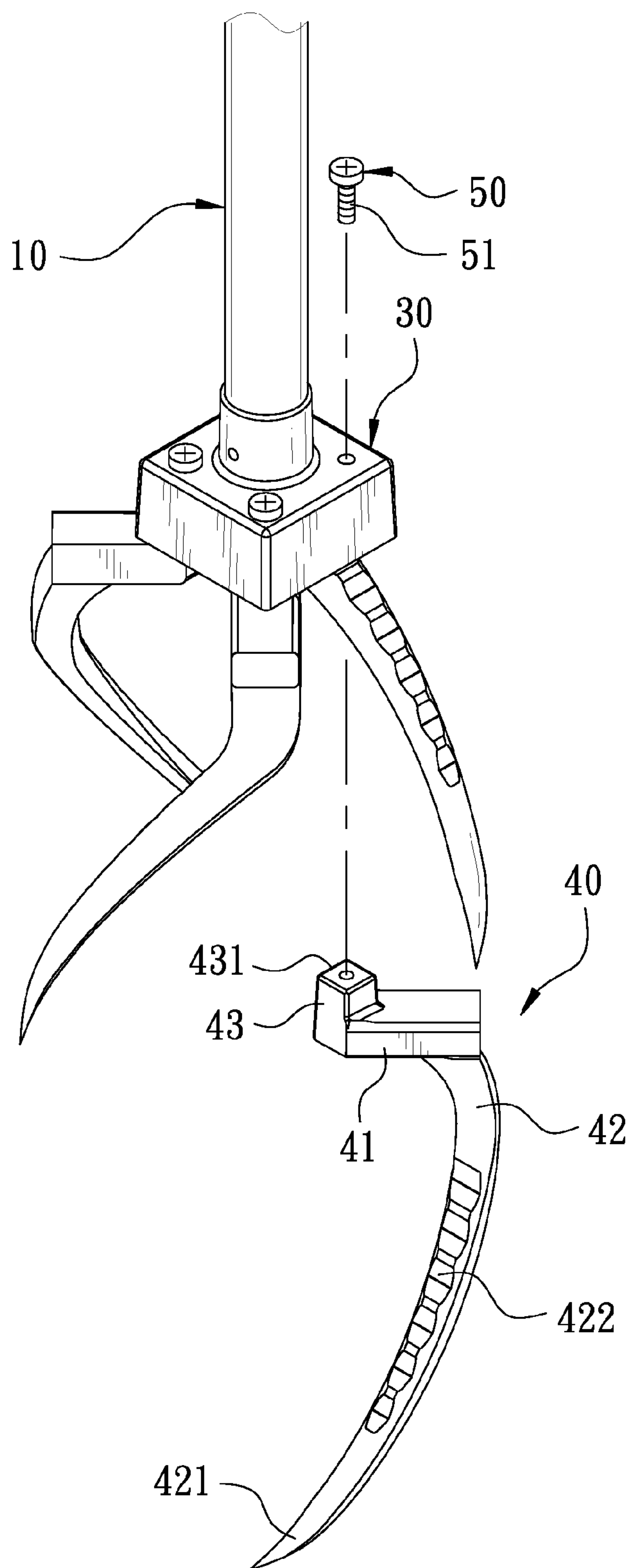


FIG. 2

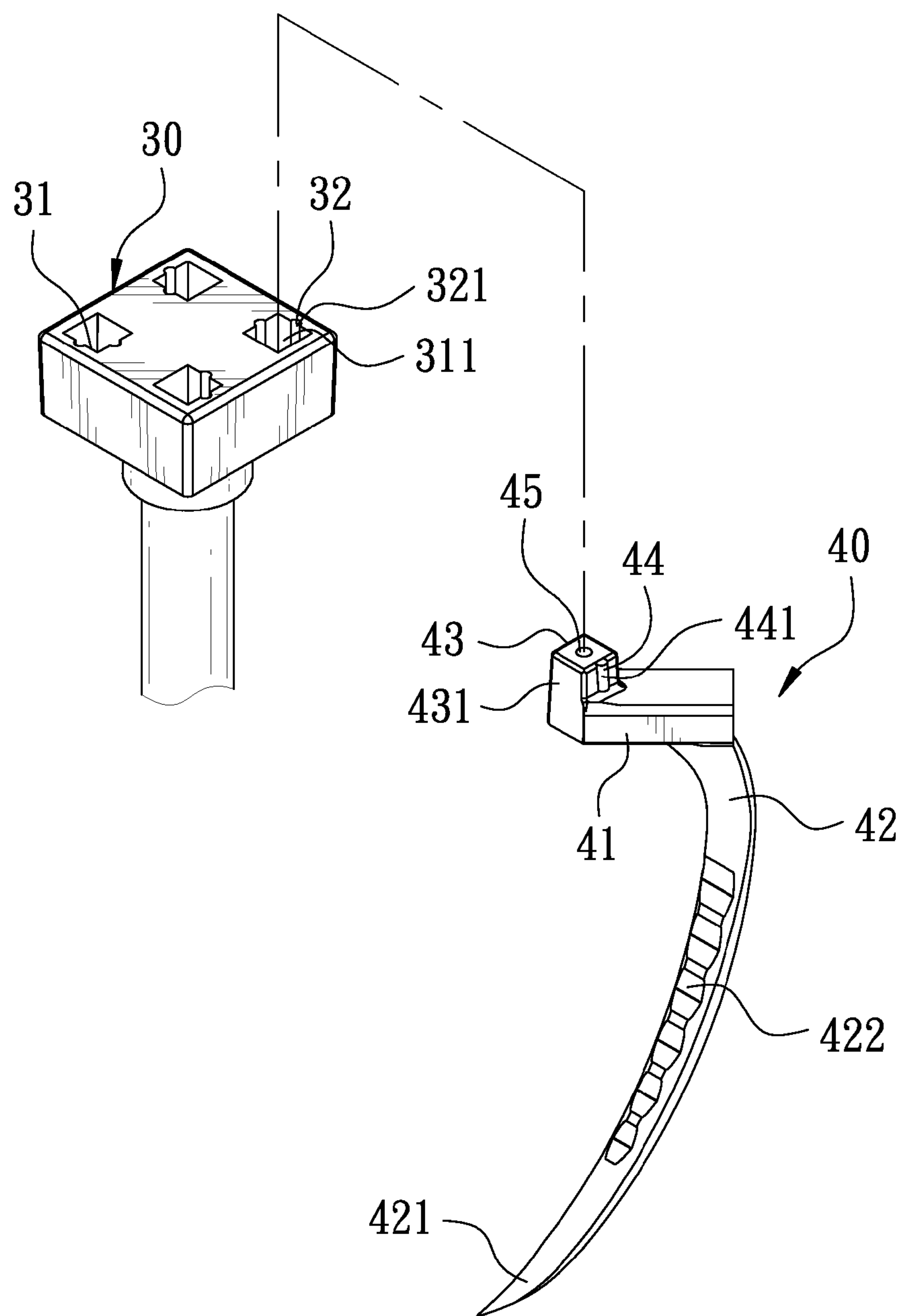


FIG. 3

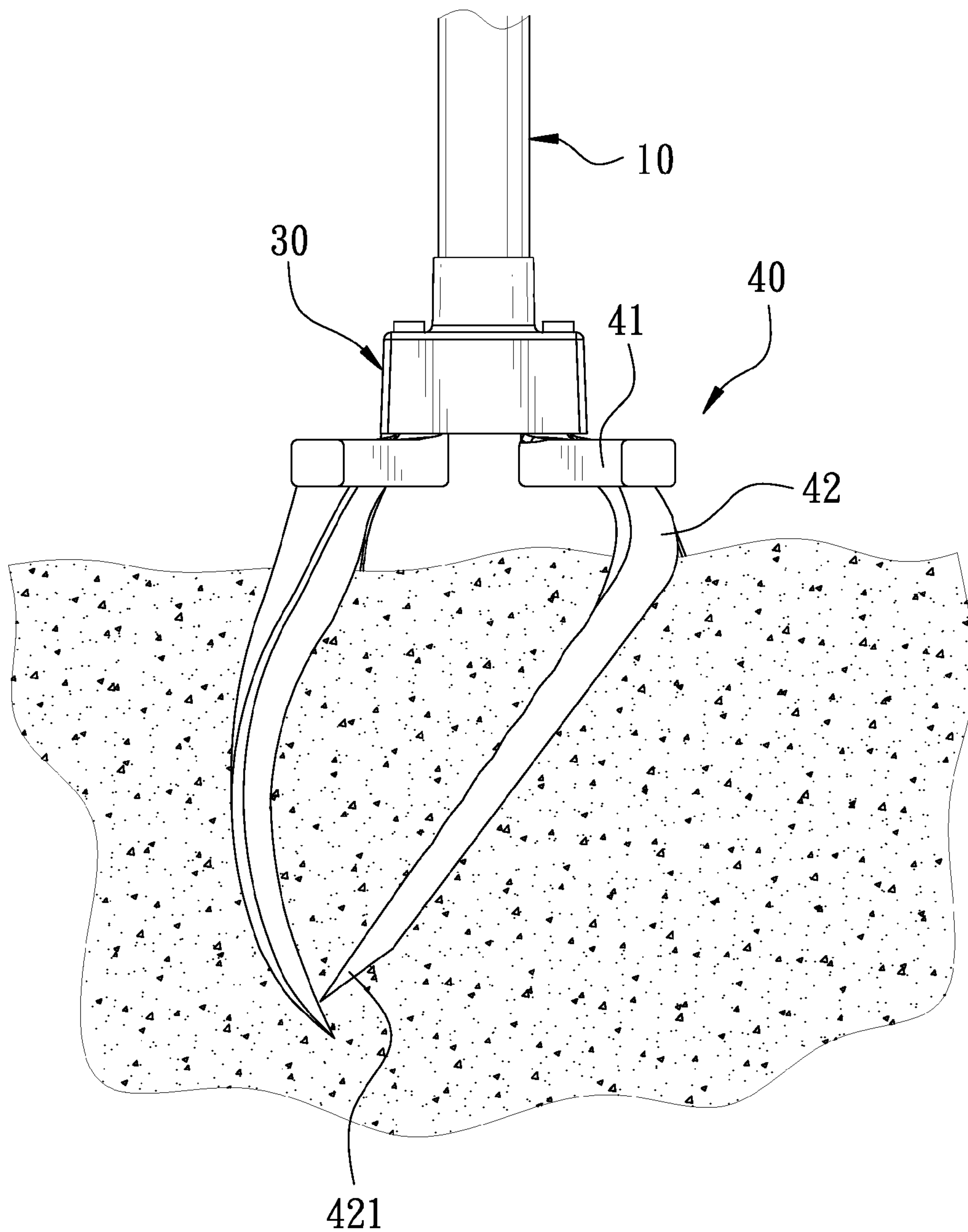


FIG. 4



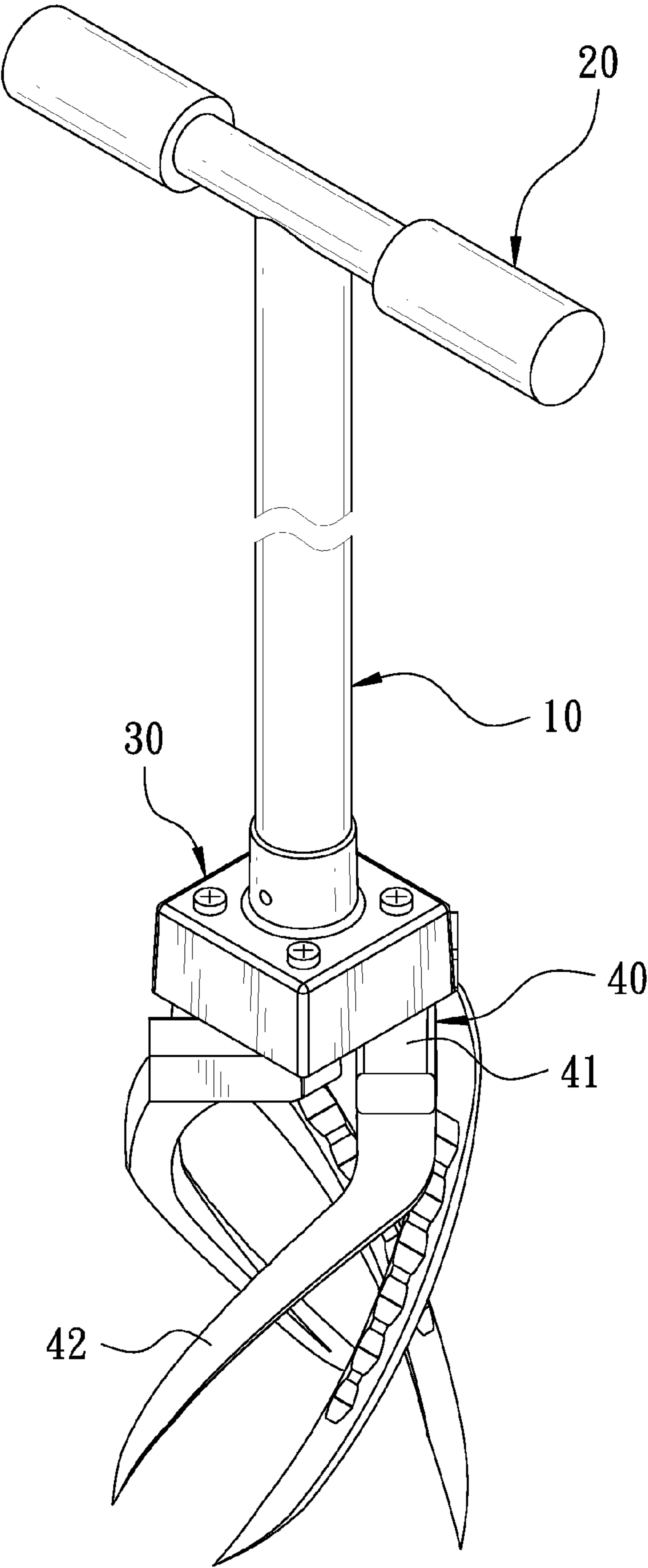


FIG. 5

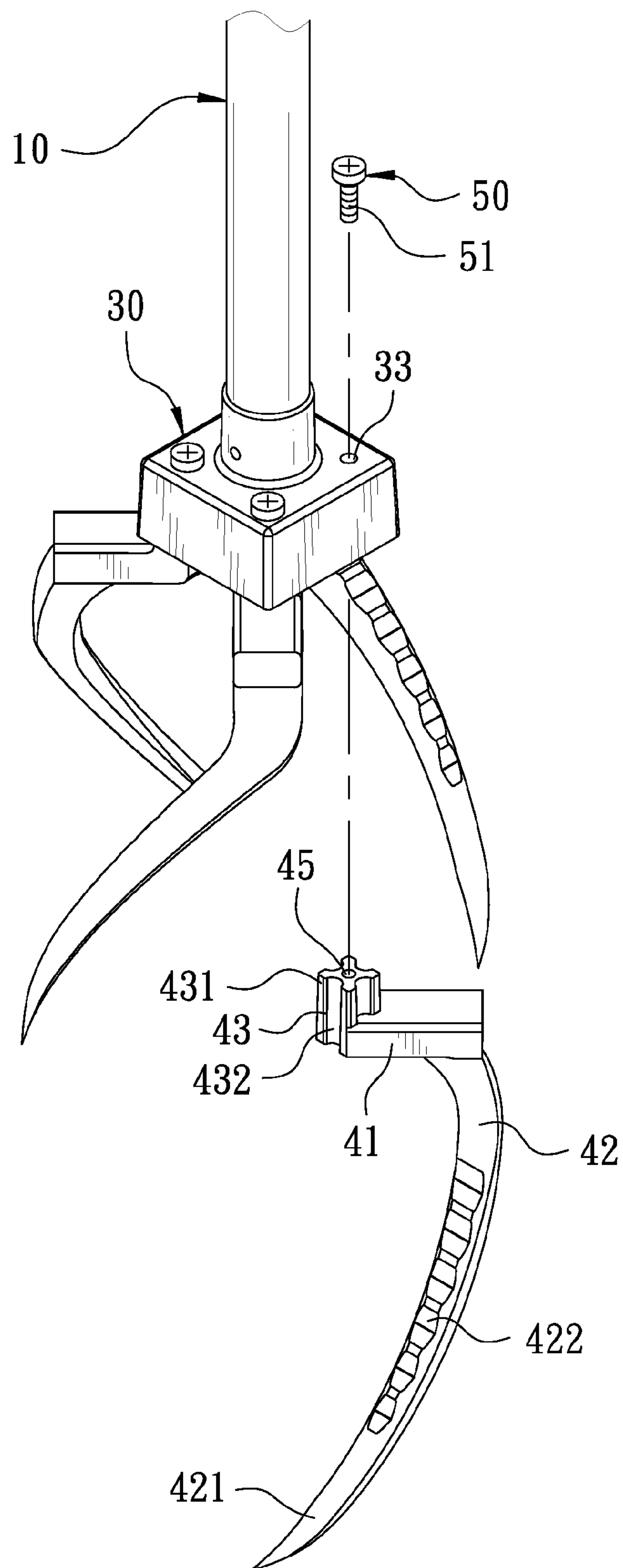


FIG. 6



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## CULTIVATOR

### BACKGROUND OF THE INVENTION

#### 1. Field of the Invention

The present invention relates to a gardening hand tool, and more particularly to a cultivator.

#### 2. Description of the Prior Art

A conventional cultivator has a rod and a plurality of claws disposed at the distal end of the rod. The claw has a base and a claw portion. The distal end of the base is fixed to the rod. The claw portion extends downward from another end of the base. When in use, the claw portion faces the ground and the rod is rotated to turn the claw portion so as to cultivate earth.

The conventional cultivator has the claw portion parallel to the axle of the rod. When a down force is applied, the rod will get contact with the ground direct. The user has to get enough strength to conquer the action force of the ground for the claw portion to be inserted in the ground. Sometimes, the user has to press the claw portion into the ground by his/her foot. Because the claw portion is perpendicular to the ground, the claw portion must be contact with the ground direct when the claw portion is turned. It is not easy to transform the applying force. The claw portion is direct pressed to the ground, and the side earth is not cultivated. It is necessary to apply a great force for turning the claw portion. This operation is laborious.

### SUMMARY OF THE INVENTION

The primary object of the present invention is to provide a cultivator which comprises an operation rod, a handle, a base, and a plurality of claw members. The operation rod has a rotating central axle. The handle is disposed on one end of the operation rod. The base is fixed to another end of the operation rod. The base has non-circle connecting troughs at a circumferential portion thereof. Each of the connecting troughs has vertical connecting surfaces therein. Each claw member has a vertical connecting block and a claw portion. The connecting block has a non-circle cross-section. The connecting block has vertical mating surfaces on outer sides thereof. The connecting block is inserted in the connecting trough. The matching surfaces are vertically engaged with the connecting surfaces and confined by the connecting surfaces. The connecting block is coupled at a predetermined angle. The claw members are disposed in an oblique and curve form.

The connecting block of the claw member according to the cultivator of the present invention is coupled in the connecting trough at a predetermined angle, such that the claw members are confined by the base. When the cultivator is operated, the claw portion will have a side action. When the user grasps the handle and applies a down force to the operation rod, the claw portion of the claw member will generate a side force. The claw portion **42** is obliquely guided into the ground, not direct contact with the ground. The claw portion is obliquely guided into the ground cultivate earth, which can be turned easily.

### BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective view according to a preferred embodiment of the present invention;

FIG. 2 is a partial exploded view according to the preferred embodiment of the present invention;

FIG. 3 is a schematic view according to the preferred embodiment of the present invention;

FIG. 4 is a schematic view according to the preferred embodiment of the present invention when in use;

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FIG. 5 is a schematic view according to the preferred embodiment of the present invention in another operating state; and

FIG. 6 is a perspective view according to another embodiment of the present invention.

### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings.

As shown in FIG. 1 and FIG. 2, a cultivator according to a preferred embodiment of the present invention comprises an operation rod **10**, a handle **20**, a base **30**, and a plurality of claw members **40**.

The operation rod **10** has a rotating central axle.

The handle **20** is disposed on one end of the operation rod **10**.

The base **30** is fixed to another end of the operation rod **10**. The base **30** has a bottom formed with four non-circle connecting troughs **31**.

In this embodiment, the connecting trough **31** has a quadrilateral shape. The connecting troughs **31** are disposed at four corners of the bottom of the base **30**. The connection troughs **31** may have a water drop shape or an equilateral shape. Each connecting trough **31** has vertical connecting surfaces **311**. Referring to FIG. 4, two of the connecting surfaces **311** of the connecting trough **31** each have a first limit portion **32** which is a limit groove **321**. The limit groove **321** forms a taper surface. Furthermore, the base **30** has a through hole **33** on a top of each of the connecting troughs **31**.

Each claw member **40** has an arm portion **41** and a claw portion **42**. One side of the arm portion **41** has a connecting block **43**. In this embodiment, the connecting block **43** has a quadrangle shape corresponding to the connecting trough **31**. The connecting block **43** has vertical mating surfaces **431** corresponding to the connecting surfaces **311**. The mating surfaces **431** also form taper surfaces. Referring to FIG. 4, the mating surfaces **431** of the connecting block **43** has a second limit portion **44** corresponding to the limit groove **321** of the first limit portion **32**. The second limit portion **44** is a limit protrusion **441** which is selectively inserted in the limit groove **321**. The claw portion **42** is disposed at a distal end of the arm portion **41** away from the connecting block **43**. The claw portion **42** is disposed in the form of a spiral curve. The claw portion **42** has a guide awl **421** at a distal end thereof. An upper side of the claw portion **42** has a plurality of concaves **422**. The connecting block **43** has a top surface formed with a threaded hole **45**. The threaded hole **45** corresponds in position to the through hole **33**. A fastener **50** is inserted in the through hole **33** and the threaded hole **45** to secure the claw member **40**. In this embodiment, the fastener **50** is a screw **51**.

In order to understand the feature, technique and expected efficacy of the present invention, the detailed use of the present invention is described hereinafter.

FIG. 4 is a schematic view of the cultivator of the present invention when in use. The user grasps the handle **20** and applies a down force. The down force is sent to the claw members **40** through the operation rod **10** and the base **30**. The guide awl **421** has a smaller contact area, which can be pushed into the ground with ease. The claw portion **42** is obliquely arranged, so a part of the down force is transferred into a side force and the claw portion **42** is obliquely guided into the ground, not direct contact with the ground. The ground is piled up by several layers, so its side action is lower and the claw portion **42** can be guided into the ground easily. The claw



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portion 42 is guided into the ground in a spiral way. When the claw portion 42 is inserted into the ground, the ground will have a transverse hole and the distal end of the guided claw portion 42 will approach the top end of another claw portion 42. All the claw portions 42 are guided into the ground within 5 the rotation radius. Then, the user further applies a force on the handle 20 to turn the operation rod 10 and all the claw portions 42 are turned to cultivate earth within the rotation radius. The present invention can be operated conveniently and easily, without the need for much strength. Besides, the 10 connection block 43 of the claw member 40 is connected to the connecting trough 31 with the matching surfaces 431 to engage with the connecting surfaces 311. When applying a force, the base 30 provides a limit function to the claw members 40 and the force is even sent to the claw members 40. 15

Referring to FIG. 4, the claw member 40 of the present invention is connected to the base 30 with the connecting surfaces 431 of the connecting block 43 to engage with the connecting surfaces 311 of the connecting trough 31. Both the connecting trough 31 and the connecting block 43 are in a 20 quadrangle shape, so the position of the connecting block 43 in the connecting trough 31 can be adjusted to change the direction of the claw member 40. By this change, the rotation radius of the claw members 43 can be adjusted, as shown in FIG. 1 and FIG. 5. Referring to FIG. 4, the first limit portion 32 of the connecting trough 31 is adapted to limit the connecting direction of the second limit portion 44 of the claw member 40, preventing the claw member 40 from being 25 wrongly connected when in use.

FIG. 6 shows another embodiment of the present invention, which is substantially similar to the aforesaid embodiment with the exceptions described hereinafter. The matching surface 431 of the connecting block 43 of the claw member 40 has vertical grooves. 30

Although particular embodiments of the present invention 35 have been described in detail for purposes of illustration, various modifications and enhancements may be made without departing from the spirit and scope of the present invention. Accordingly, the present invention is not to be limited except as by the appended claims.

What is claimed is:

1. A cultivator, comprising:

- an operation rod having a rotating central axle;
- a handle disposed on one end of the operation rod;
- a base fixed to another end of the operation rod;
- the base having non-circle connecting troughs at a circumferential portion thereof;
- each of the connecting troughs having vertical connecting surfaces therein;
- a plurality of claw members;
- each of the plurality of claw members having a vertical 40 connecting block and a claw portion;

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the connecting block having a non-circle cross-section; the connecting block has a polygon shape and each of the connecting trough has a corresponding polygon shape; the connecting block having vertical mating surfaces on outer sides thereof; the connecting block being inserted in the connecting trough; the mating surfaces being vertically connected to the connecting surfaces and confined by the connecting surfaces; the connecting block being coupled at a predetermined angle; the claw members being disposed in an oblique and curve form; each of the claw members has an arm portion between the connecting block and the claw portion; the connecting block is disposed at one end of the arm portion; and the claw portion is disposed at another end of the arm portion, wherein by connecting the vertical connecting blocks at different positions of the connecting troughs the claws pivoting around the operation rod with various coverage of operations.

2. The cultivator as claimed in claim 1, wherein the connecting block has a threaded hole, each of the connecting troughs has a through hole corresponding in position to the threaded hole, and a fastener is adapted to lock the through hole and the threaded hole.

3. The cultivator as claimed in claim 1, wherein the matching surfaces of the connecting block has at least one vertical groove. 30

4. The cultivator as claimed in claim 1, wherein the claw portion is disposed in the form of a spiral curve.

5. The cultivator as claimed in claim 1, wherein the connecting surfaces have at least one first limit portion, the mating surfaces have at least one second limit portion, and the second limit portion is selectively inserted in the first limit portion. 35

6. The cultivator as claimed in claim 5, wherein the first limit portion is a limit groove and the second limit portion is a limit protrusion. 40

7. The cultivator as claimed in claim 1, wherein an upper side of the claw portion has a plurality of concaves.

8. The cultivator as claimed in claim 1, wherein the claw portion has a guide awl at a distal end thereof. 45

9. The cultivator as claimed in claim 1, wherein the connecting surfaces of each of the connecting troughs form taper surfaces.

10. The cultivator as claimed in claim 9, wherein the mating surfaces of the connecting block form taper surfaces. 50

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